Vol. 13. Parts 2 & 3.

IMPERIAL INSTITUTE
29 DEC. 1936

Rubber Research Scheme (Ceylon)

Combined Second & Third Quarterly Circulars for 1936.

October, 1936.

H. W. CAVE & CO., COLOMBO.

Rubber Research Scheme (Ceylon).

BOARD OF MANAGEMENT.

Chairman.

The Acting Director of Agriculture, Mr. E. Rodrigo, C.C.S.

Treasury Representative.

The Deputy Financial Secretary, Mr. C. H. Collins, C.C.S.

Unofficial Members of the State Council nominated by the Governor.

Mr. George E. de Silva, M.S.C.
Mr. E. C. Villiers, M.S.C.
Mr. R. C. Kannangara, M.S.C.

Members nominated by the Ceylon Estates Proprietary Association.

Mr. J. C. Kelly,
Col. T. Y. Wright.

Members nominated by the Planters' Association of Ceylon.

Mr. F. H. Griffith, M.S.C.
Mr. B. M. Selwyn.

Members nominated by the Rubber-Growers' Association.

Mr. I. L. Cameron,
Mr. E. W. Whitelaw.

Members nominated by the Low-Country Products Association.

Mr. Leo B. de Mel, J.P., U.P.M.,
Mr. L. M. M. Dias.
Col. T. G. Jayewardene, V.D.,
Mr. J. L. D. Peiris.

Members nominated by the Governor to represent Small-Holders.

Mr. F. A. Obeyesekere, (Acting)
Mr. C. A. Pereira.

Experimental Committee.

Mr. F. H. Griffith, M.S.C.
Col. T. G. Jayewardene, V.D.,
Mr. F. A. Obeyesekere,
Mr. B. M. Selwyn,
Mr. T. E. H. O'Brien, (Convenor)

STAFF.

Director and Chemist—Mr. T. E. H. O'Brien, M.Sc., F.I.C., F.I.R.I.

Assistant Chemist—Mr. M. W. Philpott, M.Sc., A.I.R.I.

Botanist & Mycologist—Mr. R. K. S. Murray, A.R.C.Sc.

Assistant Botanist—Mr. C. A. de Silva, B.Sc., Agric (Lond.), C.D.A. (Wye)

Small-Holdings' Propaganda Officer—Mr. W. I. Pieris, B.A. Hortic (Cantab)

Estate Superintendent—Mr. D. L. Nicol.

Secretary to the Director—Mr. C. D. de Fonseka.

NOTICES.

DARTONFIELD ESTATE—VISITORS' DAYS

The *second* and *fourth* Wednesdays in each month have been set aside as Visitors' Days at Dartonfield Estate, and the services of all Technical Officers will be available to visitors on those days. The Estate Superintendent will be available every Wednesday. Visitors are requested to arrive on the Estate not later than 9-30 a.m.

While visitors will be welcomed at the Station on other days, any particular member of the Staff may not be free to give them attention unless an appointment has been made.

Dartonfield Estate is situated about $3\frac{1}{2}$ miles from the main Matugama-Agalawatte Road, the turn-off being near culvert No. 14/10. The distance from Colombo is approximately 47 miles.

IDENTIFICATION OF CLONES

The attention of Proprietors and Superintendents undertaking replanting or budgrafting programmes is drawn to Planting Manual No. 5: "The History and Description of Clones of *Hevea Braziliensis*" issued by the Rubber Research Institute of Malaya, copies of which may be purchased on application to these Laboratories for Rs. 5-00 each (postage free.) This publication gives drawings and descriptive particulars of the more important clones, which should enable Superintendents to verify the authenticity of their material.

CONTENTS

ORIGINAL ARTICLES

	Page
The Performance of Imported Clones in Ceylon—I. By R. K. S. Murray	50
Ceylon Clones—IV. By R. K. S. Murray ...	57
Field Experiments on Dartonfield Estate. II—Manuring Experiment with Mature Rubber. By C. A. de Silva	63
Field Experiments on Dartonfield Estate. III—Replanting. By C. A. de Silva ...	66
Control of Oidium on Small Rubber Estates in 1936. By W. I. Pieris	71

MEETINGS ETC.

Minutes of the 32nd and 33rd Meetings of the Rubber Research Board	81

THE PERFORMANCE OF IMPORTED CLONES IN CEYLON—I.

R. K. S. MURRAY,
BOTANIST AND MYCOLOGIST

INTRODUCTION

FOR our knowledge of the performance of the various high-yielding clones which have been imported into Ceylon we have hitherto been almost exclusively dependent on data published in the countries of origin, and with the object of keeping the Ceylon planter in touch with the latest information regarding the clones established in his field or nursery such data have, from time to time, been collated and published in the *Quarterly Circular*. Doubts are often expressed, however, as to the extent to which results obtained in other countries will be applicable to the diverse conditions of climate, elevation and, in a smaller degree, soil under which rubber is grown in Ceylon, and the time when these clones became tapped on our own estates has been eagerly awaited. There are as yet in Ceylon no large areas planted exclusively with imported clones which have reached the stage of commercial tapping, and for such figures we are still dependent on Malaya and the Netherlands East Indies. Test-tapping data of small groups of trees are, however, beginning to accumulate, and although such records are of a somewhat fragmentary nature they are considered to be of sufficient interest to merit publication at the present juncture. The following notes are intended as the first of a series of annual reviews, which will run parallel with notes on clones of local origin.

It is convenient to consider the available information under two headings: (1) Growth and (2) Yield.

GROWTH

It has been observed that not only do clones show considerable variation amongst themselves in respect of vigour of growth, but that there is a differential response to environmental conditions *i.e.*, a clone which is vigorous in one locality may be less satisfactory in another. In planning replanting or budding programmes it is clearly important to know which clones are likely

to show satisfactory development under the specific conditions in which they are to be grown, for it is obviously undesirable to select a clone which has a very high potential yield but is unsuited to the locality on account of growth or other secondary characteristic.

Our knowledge of the regional suitability of the various imported clones is very imperfect and, being based mainly on general observations, is of a somewhat empirical nature. We are in possession, however, of two series of comparative measurements which illustrate the rate of development of some of the more important clones under conditions of relatively low and high rainfall respectively. The figures are given in Tables I and II and are commented on in the notes on individual clones. It should be mentioned that the girths given in Table I are strictly comparable, being derived from replicated plots, whereas those in Table II are taken from contiguous fields, some of which are more favourably situated than others. Clones A.V.R.O.S. 49 and B.D. 5, in particular, suffer from being planted in rather exposed areas.

TABLE I.

Girth Measurements at Iriyagama Division, Experiment Station, Peradeniya.

Average Annual Rainfall: 93.3 ins. Elevation: 1,550 feet.
Planted budded stumps: October, 1929.
Seedlings as basket plants: October, 1929.
Means of 60 trees in each clone.

Clone		Girth at 3 feet in November 1933	August 1934	September 1935
Tjirandji	1	11·62 ins..	14·30 ins,	17·90 ins.
Tjirandji	16	10·36 ,,	13·26 ,,	16·31 ,,
A. V. R. O. S.	49	10·45 ,,	12·60 ,,	15·54 ,,
A. V, R. O. S.	50	9·91 ,,	11·66 ,,	14·59 ,,
Bodjong Datar	5	9·91 ,,	11·39 ,,	14·42 ,,
Tjirandji	8	9·47 ,,	11·66 ,,	14·24 ,,
Heneratgoda	2	9·51 ,,	11·33 ,,	14·12 ,,
Sungei Reko	9	9·83 ,,	11·55 ,,	13·98 ,,
Seedlings		11·02 ,,	13·55 ,,	17·02 ,,

TABLE II

Girth Measurements on Estate A, Ratnapura District (made at 3 feet from ground).

Average Annual Rainfall: 200 ins. Elevation: 400 ft.

1927 Stocks budded: 1931-32.

Clone	No. of trees measured	Percentage in Classes in June 1936			
		Under 10″	10″-15″	15″-18″	over 18″
Tjirandji 1	3,337	14·3	10·1	26·7	48·9
Bodjong Datar 10	555	12·4	23·1	30·1	34·4
A. V. R. O. S. 50	3,161	14·3	24·9	38·3	22·5
A. V. R. O. S. 49	2,362	15·2	28·0	33·6	23·2
Bodjong Datar 5	1,988	26·2	37·5	27·1	9·2
1928 Stocks budded: 1932.					
A. V. R. O. S. 256	806	22·2	69·4	8·4	—
Tjirandji 16	648	30·9	59·4	9·4	0·3

YIELD

The yield records available up to the end of 1935 are summarised in Table III. The procedure of test-tapping on the different estates is somewhat variable, the trees having been tapped in some cases for the whole year and in others for only a few months, and in order to bring the figures to a common basis they have all been calculated as a yield in lbs. dry rubber per tree for a year of 130 tappings on a half-spiral system. In some cases the recording is done on the estate while in others the rubber is sent regularly to these laboratories to be weighed.

At first sight it would appear that the variation in yield within a clone is unduly large, the figure for one estate being sometimes as much as twice the yield of trees of the same age on another estate. A partial explanation is to be found in the average girths given in column 4, but there are other reasons which cannot be mentioned in detail in an article of this nature. For example, all the yields on the Experiment Station, Peradeniya, are relatively low, and this is only to be expected

in view of the dry climate and high elevation. The figure of 130 tappings per annum, also, while considered fair for the wetter districts, is rather low for Peradeniya where the smaller yield per tapping is partly compensated by the larger number of tapping days.

Comparison of these figures with the yields of the original buddings of the same clones in the countries of origin is not possible in all cases as test-tapping was not always started at these immature ages. For most clones, however, records of "second generation" buddings are available, and on the whole it may be said that the Ceylon yields compare quite favourably with those in other countries when girth as well as age is taken into consideration.

On some estates there is an interesting comparison between the buddings and ordinary unselected seedlings planted in the same area, and the comparison is always greatly in favour of the former. The following example may be quoted:—

On Estate E a clearing was planted with seed in 1927. Alternate plants were budded in 1929, and the yields of 11 Tjirandji I buddings and the interplanted seedlings for the period November, 1934 to December, 1935 were as follows:—

	Average Girth in December 1935	No. of Tappings	Yield per tree
Tjirandji 1	25 inches	133	6·6 lbs.
Seedlings	31 ,,	133	2·3 ,,

The yield of the buddings was therefore nearly three times that of the seedlings, despite the fact that the latter were two years older and 6 inches larger in girth.

NOTES ON INDIVIDUAL CLONES

The following notes are based not only on the yields given in Table III, but also on records which are coming to hand during 1936.

Tjirandji 1.—The growth of this clone is exceptionally vigorous under all recorded conditions, and in all collections of imported clones which have come under the writer's observation Tjirandji I heads the list. Table I shows that in the relatively dry climate of Peradeniya the buddings of this clone are larger than seedlings planted as basket plants at the same time.

The yield records, also, are very satisfactory and show that the clone attains a high yield at an early age. Results from other countries indicate that the clone is susceptible to periods of drought, the yield falling off in a marked degree. Experience in the drier districts of Ceylon is insufficient to judge to what extent this will be balanced by the exceptionally high yields in the wetter months, but in the meantime it would be unwise to use this clone extensively in such districts as Uva and Matale.

The most important defect of this clone is susceptibility to wind damage on account of the heavy crown, but it would appear that the steady winds which are experienced on our exposed hill slopes are less damaging than the violent cyclonic storms which periodically occur in the flatter lands in other countries.

Tjirandji 16.—This clone is usually found to be a weak grower in the wetter districts, but it occupies second place in the Peradeniya collection given in Table I. Judged by vigour of growth it would appear to be more suited to the drier than to the wetter zones. The trees are rather susceptible to attacks of Oidium owing to a late wintering habit.

Bodjong Datar 5.—Early growth is rapid, but it is usually not until about the fourth year that the plant begins to form a crown. While the tree consists of a single main stem with a number of small, useless lateral branches the girth increase is very slow, and the clone is accordingly one of the last to attain tappable size. The formation of a crown can be artificially induced by pollarding at a height of about 8 feet as soon as the bark is quite brown at that height. The cut should be made in an internode and three shoots allowed to develop at well-spaced intervals. The growth of the clone seems to be remarkably uniform under different environmental conditions.

The yields so far obtained in Ceylon show promise but are not outstandingly high, and in view of the exceptionally high yields obtained from older buddings in Java it would appear that the clone is late maturing. B.D. 5 is probably well suited to the drier districts.

Bodjong Datar 10.—Growth is rapid and the early yields encouraging, but the clone is no longer recommended on account of susceptibility to Brown Bast, unevenness of the renewed panel and liability to wind damage.

Djasinga 1.—This is one of the older Java clones which is now generally considered to be only a moderate performer. The growth is relatively slow, but the yields obtained on Estate B (Table III) are very high.

*A.V.R.O.S. 49.**—Compared with the figures published in other countries the growth and early yields of this clone are rather disappointing. There is some evidence that A.V.R.O.S. 49 may be better suited to the drier districts.

A.V.R.O.S. 50.—This clone is now recognised in other countries as being of only moderate merit, and experience in Ceylon confirms this view.

A.V.R.O.S. 80.—This clone has not been extensively used in Ceylon, but the only record of yield available is very encouraging. Experience in Sumatra, however, shows that the buddings never attain an exceptionally high yield.

Prang Besar 23.—Growth is rather weak and early yields are not specially promising.

Prang Besar 25.—The buddings show vigorous development on a rather poor lateritic soil at the Experiment Station, Nivitigalakele, and early yields from two estates are very high. The performance of this clone in Ceylon and Malaya indicates that it will probably be of value for replanting poor land.

* Since these notes were written information has been received that the latex from buddings of this clone has an objectionable tendency to pre-coagulation.

TABLE III

Clone	Where Tapped	No. of trees	Average girth at 3 ft. in July 1935 in ins.	Calculated yield in lbs. per tree for a year of 130 tappings at ages of (years) 4	4½	5	5½	6	6½	7	7½
Tjirandji 1	Estate (A)	8	19·7				6·3				
	,, (B)	39	25·4						9·8		
	,, (C)	3	23·2	3·0		4·6					
	,, (D)	6	18·1				4·3				
	,, (E)	11	23·5					6·4			
	,, (F)	10	21·5	2·3		3·3					
	Expt. Station Peradeniya	7	19·1				3·0				
Tjirandji 16	Estate (A)	2	17·0				4·7				
	,, (B)	20	22·5						6·2		
	Expt. Station Peradeniya	6	17·5				2·8				
Bodjong Datar 5	Estatè (A)	2	17·5				3·6				
	,, (B)	47	25·0							8·7	
	Expt. Station Peradeniya	2	18·8				2·8				
Bodjong Datar 10	Estate (A)	6	17·6				5 3				
	Expt. Station Peradeniya	7	17·8				2·5				
Djasinga 1	Estate (B)	10	24·0					8·7			
	,, (D)	6	16·0				2·9				
	,, (G)	11	22·5				4·2				
A. V. R. O, S. 49	Estate (A)	2	18·7				3·4				
	,, (B)	32	25·0							5·6	
	,, (G)	2	22·2				4·1				
	Expt. Station Peradeniya	3	17·1				2·2				
A. V. R. O. S, 50	Estate (A)	3	18·5				3·4				
	,, (B)	37	25·0							6·3	
A. V. R. O. S. 80	Estate (B)	14	24·5							9·3	
Prang Besar 23	Estate (G)	2	21· 5			3·7					
	,, (H)	3	18·5			3·3					
Prang Besar 25	Estate (G)	3	21·2			5 1					
	,, (H)	3	20·7			4 8					

CEYLON CLONES—IV.

R. K. S. MURRAY,
BOTANIST AND MYCOLOGIST

FOREWORD

THIS article, presenting data for 1935, is the fourth of a series of annual reports on the test-tapping of Ceylon clones. References to the previous reports may be found as follows:—Ceylon Clones—I. *Quarterly Circular* Vol. 10, Part 2, 1933; Ceylon Clones—II. *Quarterly Circular* Vol. 11, Part 1, 1934; and Ceylon Clones—III. *Quarterly Circular* Vol. 12, Parts 1 and 2, 1935.

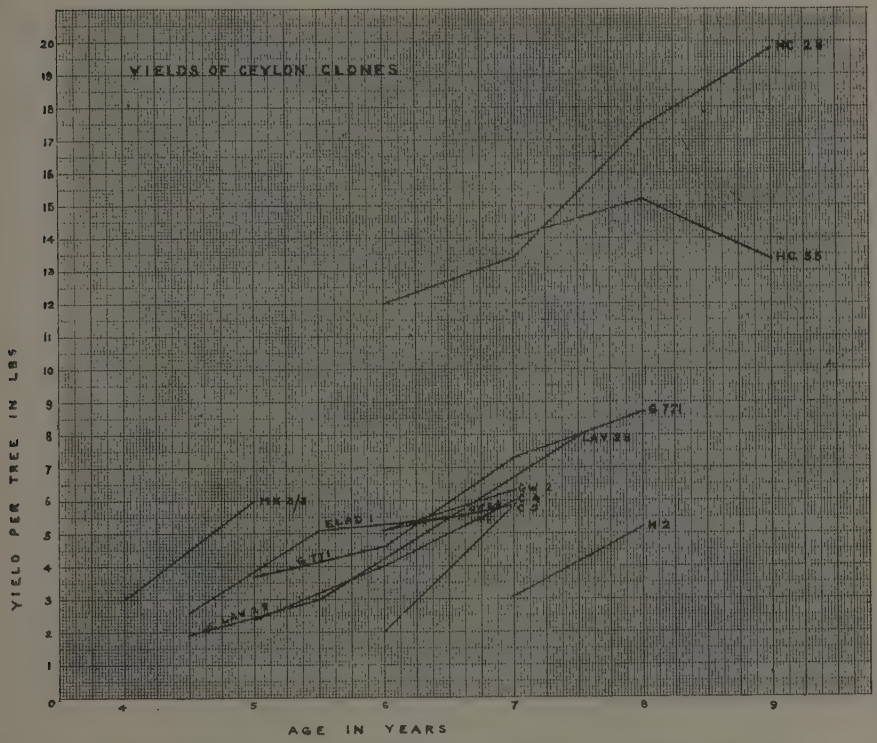
Acknowledgment is made to the undermentioned proprietors who have kindly given permission for the publication of the records of clones established from mother-trees on their properties:—

The Govinna Rubber Company, Ltd.
The Lavant Rubber Company, Ltd.
The Mirishena (Kalutara) Rubber Company, Ltd.
The Dimbula Valley (Ceylon) Tea Co., Ltd.
The Rosehaugh (Ceylon) Rubber Company, Ltd.
The Gallawatte (Ceylon) Rubber Co., Ltd.
The Tempo Tea and Rubber Co., Ltd.

PRESENTATION OF RESULTS

The yield figures for 1935 are given in Tables I and II in the same form as those for 1934. Table I gives the average yield per tree per tapping in the various months and for the full year, and the actual total yield per tree in lbs. Since the total number of tappings varies with the different clones and in nearly all cases is lower than the number that would be achieved in commercial practice, an attempt has been made to reduce all yields to a common basis, and Table II gives calculated figures for 130 tappings on the half-spiral alternate day system at the different ages. The reasons for choosing what may seem to be the rather low figure of 130 tappings are explained in No. III

of this series. The figures in Table II are also represented graphically. In all cases the rubber from which these figures are derived was weighed at these laboratories.



NOTES ON INDIVIDUAL CLONES

Govinna 771.—There is little to add to the information given last year. The yield is high, though not outstanding, but the clone possesses certain defects, the most important of which is susceptibility to wind damage, which render its commercial value doubtful.

Lavant 28.—The yield of the original 12 trees (Group A) shows a satisfactory advance and the results from the younger buddings (Groups C and D) are also encouraging. There are indications that this clone may prove to be late maturing, *i.e.*, may attain a higher yield at maturity than the earliest results would suggest, and as the trees are very robust and vigorous and have shown no defects the clone may become valuable for

replanting poor land. A long delay in attaining a high yield is an obvious disadvantage which would only be offset if the clone were to give very high yields at maturity, and further tapping is necessary before it can be determined whether this will prove to be the case.

Eladuwa 1.—The increase in yield from 1934 is disappointing in view of the average girth increment of 5 inches.

Millakande 3/2.—The yield of the 12 trees at Nivitigalakele *viz*: 5 lbs. per tree for 108 tappings at 5 years old, is extremely high, and on account of the vigorous growth and excellent appearance of the trees on a poor lateritic soil the clone must be considered one of the most promising of the local products. The virgin bark is thin but renewal is excellent. The results from Millakande Estate itself are not so satisfactory, but the general level of growth and yield on this estate appears to be lower. In this connection it may be mentioned that the 10 buddings of this clone gave a higher yield than 10 trees of Tjirandji I (also tapped on Millakande Estate) budded a year later but only slightly smaller in girth.

Millakande 1/1.—This clone is included in these notes for the first time. The growth is rather weak and on Nivitigalakele it was found a somewhat difficult clone to bud, but the yields on Millakande Estate are very encouraging. The clone has also recently been taken into test-tapping at Nivitigalakele, and the yields to date are considerably higher than those of Prang Besar 23 and 25 of approximately the same age and size.

Heneratgoda 2.—Records of this clone are included, not by reason of any particular virtue, but because the clone was widely used some years ago and is of general interest as being the budded progeny of a famous mother-tree. The early results are not promising, but there are indications from some of the largest trees that useful yields may be given as the grafts mature.

Cuilcagh 4.—This and the following clone are mentioned for the first time. Here, again, the earliest yields were not very encouraging but recent increases have been satisfactory. The clone has a fine upright habit and is a very vigorous grower. Virgin bark is relatively thick and renewal satisfactory. One tree developed Brown Bast after two years' tapping.

Cuilcagh 5.—The big increase in yield during 1935, *i.e.* from 6.9 grams per tapping in 1934 to 20.5 grams in 1935,

TABLE

Clone	Where tapped	No. of trees	Average		Average yi				
			Age years on	Girth ins at 3 ft. 1/7/35	1932	1933	1934	Jan.	Feb.
Govinna 771 (A)	Nivitigalakele	12	8	29·9	13·1	16·2	25·4	27·8	28·5
Ditto (B)	Ditto	11	8	24·0			16·2	19·7	16·9
Ditto (C)	Ditto	9	7	25·2			16·7	21·5	21·2
Ditto (D)	Ditto	10	7	24·1			29·7	40·0	38·5
Lavant 28 (A)	Ditto	12	7½	31·6	6·8	10·6	19·2	22·7	25·4
Ditto (C)	Ditto	10	6	26·5			9·7	11·7	12·9
Ditto (D)	Ditto	10	6	26·0			17 0	20·5	22·2
Eladuwa 1	Ditto	12	6½	29·0		9·2	17·8	12·6	16·0
Millakande 3/2	Ditto	12	5	26·5			10·7	13·7	14·5
Ditto	Millakande	10	6	23·0				9 8	9·8
Millakande 1/1	Millakande	5-10	6	20·2				11·2	9·6
Heneratgoda 2 (A)	Nivitigalakele	12	8	26·2			10·7	12·4	15·1
Ditto (B)	Ditto	10	8	24·2			9·9	10·0	12·5
Cuilcagh 4	Ditto	12-11	7	29·2		8·4	14·1	12·2	16·4
Cuilcagh 5	Ditto	12	7	25·5			6·9	9·0	8·5
Hillcroft 28	Stennes	10	9	35·4	41·9	46·7	60·9	59·6	65·7
Ditto	Ditto	10	9	28·0					
Hillcroft 55	Ditto	9	9	32·8		49·1	53·3	50·1	44·2
Ditto	Millakande	10	5	19·0					
Gallawatte 2	Gallawatte	10	7	26·0			17·8	18·7	
Gallawatte 24	Gallawatte	10	7	25·0			17·9	17·7	

½ sp.a.d. = ½ spiral alternate day
⅓ sp.3.d. = ⅓ spiral every three day
D/4 = Double-four *i.e.*, tappin
on two opposite half-s

* Tapped on ½ sp.a.d. up to 10th July

d in grams dry rubber per tree per tapping										Tapping system	No. of tappings	Actual Yield per tree in lb.
r.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	1935			
	22·2	23·7	14·7	26·3	29·0	35·0	33·8	38·9	38·1	30·3	½sp.a.d.	110	7·4
	14·5	12·6	11·5	18·6	18·7	18·1	20·5	20·3	22·0	18·3	do	109	4·4
	15·9	14·3	13·7	18·4	17·9	23·5	22·9	24·3	23·8	20·5	do	108	4·9
	24·0	24·8	18·6	31·5	40·7	42·9	41·9	48·9	52·0	38·1	D/4	60	5·1
	17·5	21·3	18·1	32·5	31·7	32·6	32·0	30·5	33·5	28·8	½sp.a.d.	110	6·8
	9·4	11·7	11·9	21·1	18·9	18·4	18·6	19·8	21·1	16·6	do	110	4·0
	16·5	21·5	18·5	32·0	37·8	48·3	51·8	61·0	62·3	38·2	D/4	60	5·1
	14·8	17·0	18·5	16·4	18·6	21·3	19·0	24·2	29·2	19·1	½sp.a.d.	111	4·7
	10·7	11·4	10·5	15·5	17·7	28·1	28·1	33·1	29·1	21·1	do	108	5·0
	16.2	11·7	9·7	11·9	11·9	14·7	15·6	20·4	15·8	13·7	do	150	4·5
	17·1	12·8	10·6	15·2	14·6	16·2	15·9	19·2	16·2	15·3	do	150	5·0
	12·0	11·9	8·7	18·4	19·2	22·6	22·5	24.8	22·9	18·4	do	109	4·4
	9·3	10·1	7·7	16·2	18·0	19·3	20·1	22·5	19·7	16·0	do	110	3·9
	14·9	15·9	10·4	26·1	24·9	27·2	24·7	24·9	24·4	21·1	do	110	5·1
	11·6	16·0	15·6	27·8	22·0	26·6	23·1	25·9	27.4	20·5	do	110	5·0
	69.3	68·4	54·9	80·3	61·5	69·3	59·3	88·1	76·5	69·3	do	126	19·2
		50·0	40.8	73·7	86·6	86·7	86·2	97·4	92.3	73·7	D/4*	63	10·2
	48·3	50·8	49·9	59·6	51·9	56·7	62·2	70·2	63·7	55·3	½sp.3.d.	87	10·7
	6·8	12·2	7·8	9·0	7·7	10·8	11·8	11·8	12·5	10·4	½sp.a.d.	115	2·6
	0·1	17·1	18·7	22·9	24·5	28·2	27·5	21·8	25·0	27·8	22·1	do	113	5·5
	3·7	18·2	16·5	19·8	20·2	25·5	26·8	18·1	26·2	23.6	20·9	do	112	5·1

g every four days.
iral cuts.

suggests that the clone may mature well. The habit of the trees is upright and the growth moderately vigorous, and no defects have yet developed.

Hillcroft 28.—As reported last year, two of the original twelve trees in test-tapping developed Brown Bast in January 1935 after $4\frac{1}{2}$ years of tapping. The remaining ten trees continued to yield well and gave an actual average crop of 19·2 lbs. per tree. A further ten trees were taken into test-tapping in May, 1935, and gave an average of 10·2 lbs. per tree for the eight months. Further occurrence of Brown Bast has to be reported, one of the original trees and three of the second group developing this disease in January, 1936. The clone has since been put on to three-day tapping since when no further cases have occurred. The clone is now also in tapping at Nivitigalakele and the early yields from 6-year-old grafts are very high.

Hillcroft 55.—The original buddings on Stennes have been tapped on a single half-spiral cut every three days throughout 1935. The average yield per tapping shows a slight increase over 1934, but the total yield is lower. The disparity between the yields of individual trees, to which reference has been made in previous reports, still persists, but is rather less marked than formerly.

Gallawatte 2 and 24.—For both these clones the increase in yield over the 1934 figure is rather disappointing.

TABLE II.

Clone	No. of trees	Calculated yield in lb. per tree for 130 tappings on ½-spiral alternate day at ages of (to nearest half year)									
		4	4½	5	5½	6	6½	7	7½	8	8½	9
Govinna 771 (A)	12			3·7		4·6		7 3		8·7		
,, (B)	11							4·6		5·2		
,, (C)	9					4·7		5·9				
,, (D)	10					4·2		5·5				
Lavant 28 (A)	12		1·9		3·0		5·5		8·0			
,, (C)	10			2·8		4.7						
,, (D)	10			2·4		5·5						
Eladuwa I	12		2·6		5·1		5·5					
Millakande 3/2	12	3·0		6·0								
,,	10					3·9						
Millakande 1/1	5—10					4·3						
Heneratgoda 2 (A)	12							3·1			5·2	
,, (B)	10							2·8			4·6	
Cuilcagh 4	12—11			2·4		4·0		6·0				
Cuilcagh 5	12					2·0		5·9				
Hillcroft 28	10					12·0		13·4		17·4		19·8
,,	10											12·7
Hillcroft 55	9							14·0		15·2		13·4
Gallawattc 2	10					5·1		6·3				
Gallawatte 24	10					5·1		5·9				

FIELD EXPERIMENTS ON DARTONFIELD ESTATE. II—MANURING EXPERIMENT WITH MATURE RUBBER

C. A. DE SILVA,
ASSISTANT BOTANIST

FOREWORD

THIS is the second of a series of notes describing field experiments in progress on Dartonfield Estate and deals with an experiment designed to determine the value of manuring mature rubber. In laying out plots and blocks in an average stand of old rubber, one encounters a number of difficulties due to irregular spacing and the presence of diseased trees. The number of trees available for the experiment is smaller than for any annual crop, and there is the added difficulty of dealing with trees which are hybrid in origin showing appreciable variations in yield from tree to tree. Consideration has been given to these facts in fixing a suitable plot size with a view to reduce experimental error. Any border effects due to the different treatments have been prevented by leaving two barrier rows between plots. Errors due to differences in individual standards of tapping, as well as errors due to early and late tapping, have been compensated as far as possible by suitable methods in plot management. The basis of yield determinations has been fixed on the weight of dry rubber produced from each plot, together with the weight of dry scrap collected before the next tapping.

Trees in different plots have been painted with distinctive colours to make the work of collecting the latex as foolproof as possible. When all precautions have been taken to minimise errors in the field and factory there still remains random errors due to soil heterogeneity and seasonal variations. With a view to studying these errors, and testing out the significance of yields due to manurial treatments later, a year's uniformity trial is being carried out on these plots which have been marked out for the manurial experiment. When the yield records have accumulated for a year, hypothetical treatments will be assigned

to these plots in order that the statistical analysis of the results may correspond with that of the actual experiment. These yield records will be further used for compensating errors and correcting yields in the subsequent manurial experiment, which will be carried out for 10 years. Details of procedure will be given under appropriate headings.

SITE OF EXPERIMENT

The four blocks of this experiment have been marked out in three different fields of the estate. Two blocks are situated in field No. 6, one in field No. 3 and one in field No. 1. The object of separating these blocks is to provide a wider inductive basis for the conclusions. The total acreage under this experiment is about 19 acres at 90 trees to the acre.

DESIGN AND SCOPE OF EXPERIMENT

The effect of nitrogen alone, and in combination with phosphoric acid and potash, and the forking in of green cover with artificials, as against broadcasting artificials over the cover will be tested out as follows:—

Forking cover crop with artificials	Broadcasting artificials
O Control	O Control
N	N
NP	NP
NK	NK
NPK	NPK

Each block has been divided into two sub-blocks of five plots each, for the two systems of green manuring. The manuring will be carried out on a tree basis, the required quantities of manure being applied to give approximately equal quantities of nitrogen, phosphoric acid, and potash at the rate of 40 lbs. per hundred trees. Applications will be made annually, and manure will be applied up to the barrier rows; each plot being surrounded by a single line of barrier trees.

Nitrogen will be in the form of sulphate of ammonia, phosphoric acid as rock phosphate, and potash as muriate of potash

The experiment will provide the following information:—

The effect of P in the presence of N and K
The effect of P in the presence of N only
The effect of K in the presence of N and P

The effect of K in the presence of N only

The effect of N alone

The effect of PK in the presence of N

Also the effect of artificials applied with or without the incorporation of green material.

A cover of *Pueraria* will be established over the whole area.

GENERAL LAYOUT AND PLOT MANAGEMENT

Twenty trees constituting a single plot were painted with 3-inch bands of paint. Five distinctive colours were allotted to the first five plots. The other five plots were similarly painted but with an extra green band; these plots make up the sub-block where green manure will be forked in. The remaining 3 blocks of 10 plots each were painted in the same way, being replications of the sub-blocks already described. Ten latex buckets were painted with colours corresponding to those in the ten plots. After preliminary trials in December, 1935, the uniformity trial was started on the 1st of January, 1936.

Tapping is on the double-four system and a single block is tapped a day. Two tappers are employed and a hundred trees are allotted to each tapper as his daily task. The latex from each plot of 20 trees is collected in the appropriate buckets, and the ten buckets are brought in on "bar carriers".

The latex on arrival at the factory is passed through a sieve, and weighed on a special Avery balance in grams. The yield of each plot is recorded separately. A sample of 50 ccs is taken from each bucket, coagulated, rolled into biscuits and dried. The biscuits are weighed after 4 days. The total dry weight of rubber per plot is determined as follows:—

(A). Weight of latex in grams.

(B). Per cent dry rubber content calculated from weight of sample biscuit.

(C). Dry rubber in grams from (A).

(D). Dry rubber in scrap.

(E). Total dry rubber yield per plot (C + D).

On a normal day tapping starts early in the morning. The weighing in of latex and sampling is completed by mid-day. Plot yields are not taken into experimental records when a tapping is totally or partially washed out during wet weather. All operations in the field are carefully supervised by a specially trained Experimental Conductor.

FIELD EXPERIMENTS ON DARTONFIELD ESTATE. III—REPLANTING

C. A. DE SILVA,
ASSISTANT BOTANIST

IN continuation of the description under the above heading in the *Quarterly Circular*, the following notes refer to an experiment carried out on 13 acres of replanted land. A summary of the operations together with the costings is dealt with in their natural sequence.

SITE OF THE EXPERIMENT

The area replanted consists of a rectangular strip of about 13 acres, out of a field planted with Rubber in 1917. It is bordered on one side by Crown jungle. The gradient of the land is moderate, but owing to its extremely rocky nature the original intention to plant on contour platforms was abandoned in favour of level-pitted drains. The original stand of old trees was about 125 to the acre.

DESIGN AND SCOPE OF EXPERIMENT

The whole area is divided into four blocks of 9 plots each. The blocks have been planted with the following clones, one clone to a block:—Tjirandji 1; Bodjong Datar 5; Wawulugala 259; Hillcroft 28. Each block carries 8 manurial treatments with a control, corresponding to the 9 plots. The number of trees per plot varies with the general terrain of the land, but measurements will in all cases be made from a group of sixteen trees within the plot. The remainder may be regarded as boundary trees to prevent any marginal effect.

The eight manurial treatments include nitrogen in single and double doses, and in combination with phosphoric acid and potash as follows:—

N_1, N_2, N_1P, N_1K, N_2P, N_2K, N_1PK, N_2PK,

In the absence of any precise knowledge as to the best forms in which to apply the various nutrients, it has been thought desirable in a preliminary orientating experiment of this nature to use somewhat complex mixtures. Thus, nitrogen is applied as to 4 parts of inorganic (sulphate of ammonia) to 1 part of

organic (bloodmeal and groundnut cake representing animal and plant sources respectively), phosphoric acid as to 1 part concentrated super-phosphate (water soluble) to 1 part rock phosphate (not water soluble). Potash is applied as the chloride (muriate). The actual rates of application will increase with increasing size of the plants.

Each plot of 16 trees is again sub-divided into two halves, in one of which green manure will be forked in together with the fertiliser, while in the other, loppings will be mulched on the surface.

The experiment will provide the following information:—

The effect of N alone

The effect of N_2 alone

The effect of K in the presence of a single or double dose of nitrogen.

The effect of P in the presence of a single or double dose of nitrogen

The effect of K in the presence of N and P

The effect of K in the presence of N_2 and P

The effect of P in the presence of N and K

The effect of P in the presence of N_2 and K

The effect of PK in the presence of a single or double dose of nitrogen

The value of forking in green manures grown *in situ* with and without artificial fertilisers.

Also a general comparison between the four clones, although not statistically valid.

The following is a diagram of the experiment:—

T. J. 1 B. D. 5 W. 259 H. C. 28

(x) N_1K (y)	N_2P	N_1P			
0	N_2	N_2PK			
N_2K	N_1PK	N_1			

(x) and (y) represent the two sub-plots, for the two systems of green manuring.

PROGRESS OF WORK UP TO DATE

Attention is here given to points which are of special interest to those who will be carrying out replanting work. Extra expenditure incurred for certain operations is inevitable owing to special experimental requirements. Although such operations are discussed in the general description, expenditure under these heads has been deleted from the general summary of costs, to bring it in line with ordinary estate practice.

Lining and Holing—commenced on the 26th of November, 1934. The planting distance was 15 feet on the contour and 20 feet between contours. Two adjacent contours were allowed to diverge to a maximum of 25 feet and converge to a minimum of 15 feet. Outside these limits the contours were broken and recommenced at a distance of 20 feet. Holes were cut $2\frac{1}{2}$ feet square and 3 feet deep at 11 cents per hole. Although the theoretical planting density at 20×15 is 145 trees to the acre, owing to the large amount of rock, the actual number of holes per acre only amounted to 106. The large number of incompleted holes accounts for the somewhat high figure of Rs. 16·74 per acre for this item.

Felling—commenced on the 5th January, 1935. The uprooting and felling work, which was done by elephant, was given on contract at the rate of 10 cents per tree. The actual work was completed in four days. A further area of 2 roods 31 perches was opened out later, the work being completed on the 19th of January, 1935.

Cutting, Stacking and Burning—commenced on the 17th of January, 1935. These operations consist of cutting off all side branches, heaping them up irregularly in spots clear of holes, and laying the heavier logs, cut into lengths 10 to 12 feet, on the top of these heaps. These arrangements facilitate the starting of the burn and help it to carry on to completion in favourable weather Wet weather about this time interfered with the burning, entailing further labour and expenditure under this head. The total cost of cutting, stacking, and burning was Rs. 49·41 per acre. This is very high; a more average estate figure will be Rs. 20·00 per acre. A complete burn was finally effected through the whole area.

Dynamiting of Holes—started on February 15th. All holes which after preliminary examination did not contain any slab rock, but only a few projecting obstacles of rock and hard

cabook, could be brought in after a system of judicious dynamiting. It is not necessary to blast till every trace of rock has disappeared, provided there is sufficient soil for the main roots to make headway. 363 holes were dynamited in all at a cost of Rs. 15 per acre. This figure, again, is higher than average owing to the extreme rockiness of the land.

Filling of Holes—started on the 1st of March and was completed on the 21st. Careful supervision at this time will be well repaid. Use should be made of the fresh ashes from the burn, and rubber leaves, for mixing with the best soil available. In this way a useful quantity of plant nutrients from the old stand is concentrated for the use of the young stumps. Costs worked out to about 13 cents a hole.

Cutting Pitted Drains—started on the 27th of March, 1935; level contour drains 18 inches broad, with pits 5 feet long and 2 feet deep from surface level, alternating with bunds 3 feet long cut down 6 inches from surface level. The drains run between contours commencing from "Netti-kans". Existing lateral drains were used where they were not too steep. Cost per acre Rs. 19·41.

Weeding—was done when necessary. Weeding operations started on the 10th of April prior to sowing of green manure seed. Cost per acre worked out to Rs. 7·74 for the first year.

Establishing Cover Crops—commenced on the 24th of April, 1935. A suitable cover is an essential feature of the new clearing. The seed should be dibbled in over the earthworks with the first showers. Mixed seed of *Crotalaria anagyroides*, *Calopogonium mucunoides* and *Centrosema pubescens* were sown in equal proportions by weight, at the rate of 3 lbs. per acre. Unfavourable weather conditions held up work for some time but after further efforts a fair germination was noticed in May. The cost was Rs. 3·25 per acre.

Planting Out—commenced on the 13th of June. All the blocks were planted out with budded stumps from the nursery. Stocks were ringed in the nursery at 3 feet about a week before planting and cut back to 6 inches from the bud at planting. A census made in August, 1935 of all plants in the four blocks showed a very high percentage of casualties in Blocks 2 and 4, corresponding to clones BD. 5 and HC. 28.

Clone		No. Planted	No. Dead
Tj. 1	...	369	42
BD. 5	...	322	215
W. 259	...	175	13
HC. 28	...	361	228

Considering the very dry weather that prevailed during July, the results were not altogether unexpected. In most cases, it was found that the stocks themselves were reduced to a very poor condition before the bud-patches showed signs of failure. In the light of experience gained in planting out this area, early completion of earthwork and early planting with the first regular monsoon rains must be aimed at. In this connection the necessity of having vigorous growing plants in the nursery must again be stressed. The cost of stumps, which worked out at Rs. 35·18 per acre, is rather high as the entire cost of the nursery was debited to the clearing and the nursery was unnecessarily large.

Fencing.—The whole area was eventually closed with barbed wire fencing. Costs vary according to the choice of posts. Fencing with wooden "Milla" posts costs about Rs. 15 per acre. In this case iron posts were used entailing higher costs.

Manuring.—In January 1936 all 4 blocks were manured according to experimental requirements. The quantities of manure carrying the required amount of plant nutrients per tree were determined, mixed with washed river sand to give the necessary bulk for distribution, and dibbled round each plant.

Costs.—The following is a statement of the costs per acre for this clearing. The figures should be read in conjunction with the above notes, for in some cases the costs are abnormally high.

	Cost per acre Rs. cts.		Cost per acre Rs. cts.
Supervision ...	17·31	*Brought forward* ...	148·38
Lining and Holing ...	16·74	*Budded stumps, initial*	
Felling	12·50	*cost and upkeep* ...	35·18
Cutting, stacking and		*Planting out* ...	3·22
burning ...	49·41	*Weeding* ...	7·74
Dynamiting ...	15·61	*Paths and steps* ...	1·02
Filling of Holes ...	14·15	*Tools*	4·43
Cutting of pitted drains	19·41	*Repairs to drains* ...	0·32
Establishment of cover		*Supplying* ...	2·48
crop	3·25		
Carried over ...	148·38	Total ...	202·77

CONTROL OF OIDIUM ON SMALL RUBBER ESTATES IN 1936

W. I. PIERIS.

SMALL-HOLDINGS' PROPAGANDA OFFICER

INTRODUCTORY

FOLLOWING the increased incidence of Oidium infection on Rubber in the mid-country districts of Ceylon in recent years and the demonstration of its control (by sulphur-dusting) to small-holders in 1935, a decision was made by the Rubber Research Board to carry out a campaign of sulphur-dusting small estates and holdings in the Central Province during the refoliation season of 1936. A grant of Rs. 20,000 for the purpose was provided by Government from the Rubber Restriction Fund. The object of the scheme was to demonstrate the value of sulphur-dusting in controlling Oidium leaf disease and to gain experience of the cost and type of organisation required for dusting small estates and holdings on an extensive scale.

SELECTION OF AREAS

Approximately 200 acres of rubber, consisting of small-holdings of 1 to 10 acres and small estates of 11 to 100 acres, were selected from each of 5 Agricultural Instructors' Ranges, making a total of approximately 1,000 acres. The ranges selected were Gampola, Katugastota, Udispattu, Rattota and Matale, embracing the most severely affected localities in the Central Province. At Gampola and Udispattu, which are mainly tea and cocoa districts, difficulty was experienced in obtaining suitable areas to make up the requisite 200 acres, but these shortages were made good by taking slightly larger acreages at Rattota and Matale. The actual acreages selected were:—

Gampola	...	186 acres
Katugastota	...	204 ,,
Udispattu	...	188½ ,,
Rattota	...	211 ,,
Matale	...	213½ ,,
Total	...	1,003 ,,

A provisional selection of estates and holdings in each range was made by the Agricultural Instructors of the Department of Agriculture on instructions issued by the Rubber Research Scheme, and a final selection made therefrom by the writer. A number of the provisional selections had to be rejected after an estate-to-estate inspection and new ones found in their place, chiefly owing to the lack of a sufficient stand of rubber due to interplanting with other crops. In selecting estates preference was given to proprietors who were prepared to contribute a nominal fee of Rs. 2·50 per acre for small estates and Re. 1 per acre for holdings for the complete treatment. A circular announcing the proposed charges and calling for applications received little response, there being only a few estate owners and no small-holders at all who expressed a willingness to pay. Out of the 1,003 acres finally dusted, 298 acres (estates) were done on payment and the remainder free of charge. The attention of owners of holdings which were dusted free was drawn to the fact that in future years the work is not likely to be repeated except on payment. A few applications from owners of estates who were willing to pay were received when the season was too far advanced for the commencement of dusting. In order to make the experience gained from the dusting campaign as representative as possible a fairly wide variety of estates in relation to size, accessibility and steepness, etc., was selected.

STAFF AND ORGANISATION

Dusting operations were carried out by a staff of 5 temporarily-appointed dusting supervisors under the direct personal supervision of the writer. The supervisors were selected from 73 applicants who were required to possess a knowledge of Sinhalese and agriculture and experience of petrol engines. Throughout the dusting they did keen and satisfactory work. On appointment these officers were initiated into the correct use of the dusting machine, given short practical training in dusting and allocated to their 5 respective ranges. A new dusting machine was assigned to each supervisor. On arrival at their ranges their first duty was to visit and familiarise themselves with each of the areas to be dusted and thereafter to keep a careful watch on the progress of refoliation so that the first dusting might be given at the correct stage. The commencement of dusting of each estate at just the proper time is a factor of considerable importance and has an appreciable effect on the results obtained.

The selected areas in a range were divided into 5 groups so that the areas in one group were as far as possible near to each other and could be dusted in one day. The 5 groups were dusted on 5 days of the week while the sixth day was left free in case of interference from rain. The same order of dusting was followed each week so as to give each area a 7-day dusting. The first day's dusting in each range was personally supervised. Each range was thereafter visited at least once a week throughout dusting operations.

EQUIPMENT

(a) *Machines.*—3 h.p. "Noidium" dusting machines, which proved well-suited for the work, were used. Throughout dusting operations hardly any trouble was experienced and the lightness in weight of the machine (158 lbs.) as compared with most other makes was a special asset in carrying it about practically all day long. Although no serious defects in the machine were apparent during the present dusting a few minor improvements were felt to be necessary. The petrol tank was observed to be too delicate and tended to leak and even crack at slight provocation. A tank made of stronger metal and fixed more firmly to the machine so as to withstand its vibration is a necessity. The aluminium chimney, which tended to get dented very easily, might also be rather more substantially constructed.

Special care was observed in the use and maintenance of the machines. This in fact was the main secret of their efficient service. They were frequently cleaned and the fuel (oil and petrol) correctly mixed with the help of specially prepared measures supplied by the writer to each supervisor. Care should be exercised in re-filling the hopper with sulphur, as the fine particles of sulphur are often the cause of engine trouble if allowed to get into the carburettor etc.

One out of the two spare machines held in reserve had to be brought into use as a result of minor repairs to one of the machines.

(b) *Sulphur.*—Two makes of sulphur, "Cirrus" and "Cooper's", were used for dusting. About a ton of sulphur was issued to the supervisor in charge of each range at a time. 3 of the supervisors succeeded in arranging to store the sulphur issued to them free, while sums of Rs. 5 and Rs. 3 respectively were incurred by the other two for the entire season's storage.

Cooper's sulphur, which is Rs. 16·40 per ton cheaper than Cirrus, tended to cake slightly inside the bags due mainly to air entering through the hessian bags in which it was supplied. This drawback might be remedied if the sulphur were supplied in more airtight paper bags. Caking results in tiny unpulverised lumps of sulphur, $\frac{1}{4}$ in. or so in diameter, passing into the container of the machine through the somewhat wide-meshed wire sieve on the top of the container. When the machine operates, these lumps, instead of being ejected into the air as dust, fall to the ground in little pieces. Thereby a considerable wastage results. The quantity in each bag (one cwt.) is too unwieldy to be carried about conveniently during dusting and would be preferable if reduced. Cirrus sulphur was free from these defects. Both sulphurs appear to have good cloud-forming properties, though experience with Cooper's was confined to the last 2 or 3 weeks of dusting.

DUSTING PROCEDURE

(a) *Progress of Work.*—Dusting was commenced at each estate or holding in each range directly about 20 per cent of the trees of the estate or holding had begun to refoliate after wintering, (*i.e.* when the new leaflets were just visible) and continued at 7 to 9-day intervals until 80 to 90 per cent of the trees had matured their leaf. A 9-day dusting was resorted to only when, owing to unavailability of labour on public holidays etc., it was unavoidable. The first to be dusted were 3 holdings in the Katugastota range which were given their first dusting on January 14th, which may be considered a somewhat early date for starting. Taken as a whole range, however, Gampola was the earliest to winter. Dusting in the Gampola and Katugastota ranges was started in January and February and more or less completed by the end of March while that at Udispattu, Rattota and Matale was started during February and March and continued till the 15th of May. This was due to the fact that whereas at Gampola and Katugastota wintering was early and even, at Udispattu, Rattota and Matale it was both late and uneven, (*i.e.* all the trees in one estate not wintering more or less together). In fact in certain estates in the 3 latter ranges wintering was so irregular that even after giving them as much as 13 dustings lasting up to the 15th of May, a considerable portion of the trees had still not refoliated. Where the number of dustings had to be increased in this manner, only portions of the estate which were actually ready were dusted on each occasion.

The 1,003 acres dusted in the 5 ranges consisted of a total of 67 individual estates and small-holdings, the largest of which was 100 acres in extent and the smallest 1 acre. The number of dustings administered to each area varied from 5 to 13 according to the duration of the period of refoliation.

(b) *Transport.*—Transport of dusting-machine and sulphur to the various holdings within each range was done by bullock-cart at a cost of Rs. 2 to Rs. 3 per day according to the distance travelled. Very often a day's work for a cart at this rate meant setting out in the early hours of the morning and travelling from holding to holding until about 4 p.m. A day's circuit sometimes amounted to as much as 22 miles. When the holdings for a day's dusting were situated close together, considerable economy was effected by dispensing with the cart and getting the machine wheeled on the little trolley which can be bought with the machine.

Sulphur was supplied to the Gampola, Matale and Rattota ranges from a main stock in Colombo by train, while to the Katugastota and Udispattu ranges, which were close to Kandy, it was supplied by lorry from a stock kept at Kandy. Lorry transport was done by the Midland Garage, Kandy, (@ 35 cents a mile), who also stored the Kandy stock of sulphur free of charge.

(c) *Labour.*—Sinhalese labour was employed throughout. A man was paid 75 cents a day for carrying the dusting machine. which is heavy work. Four men were employed for each machine No real difficulty was experienced in securing labour and a set of men once trained took well to the work. A few men deserted, but substitutes were easily found. Where supervisors were able to secure the services of men who had been trained by the writer last year, no difficulty at all was experienced. All labourers were paid weekly and receipts obtained.

(d) *Sulphur Bombs.*—Out of the total 1,003 acres dusted, two one-acre holdings, at Gampola and Galagedera respectively, were experimentally dusted entirely with sulphur bombs. The trial was undertaken in view of the possibilities that bomb-dusting might have for dusting holdings whose owners were not in a position to afford machine-dusting and also for its possibilities in dusting groups of early and late-wintering trees on estates. $\frac{3}{4}$, $\frac{1}{2}$ and $\frac{1}{4}$ lb. bombs were used. The method adopted was to suspend the bomb at the end of a long bamboo, ignite and hold it near the group of trees to be dusted so that on explosion the

wind would carry the cloud of sulphur to the trees. Sufficient bombs to make up the required quantity of sulphur for a dusting were taken. They were then lighted at different places in the holding in such a manner as to give it a general dusting.

The actual results obtained on the two "bombed" holdings were not sufficiently distinct from those obtained in machine-dusted areas to afford a reliable comparison of the two methods from the point of view of Oidium control, although they appeared to be less satisfactory than the results on machine-dusted areas. Factors such as differences in soil, condition of trees in each holding, etc., make a strict comparison difficult. The following observations however were made:—

1. Bomb-dusting, although it may not be as satisfactory as machine-dusting, may prove useful for dusting small groups of early or late-wintering trees, or for dusting inaccessible and very small holdings.

2. The small cloud of sulphur expelled at a time makes control of its direction difficult as a slight deviation would suffice to make it miss its object. Under changing wind conditions this may prove both troublesome and wasteful. The task of watching which precise trees in a holding have had the dust and which not, is also rendered difficult.

3. It is difficult to discern how much of the cloud is actual sulphur and how much is smoke. The smoke usually rises and disappears more rapidly than the sulphur but at times discrimination is difficult.

4. More time is taken than with machine-dusting.

RESULTS AND OBSERVATIONS

Generally speaking, the results of dusting have been distinctly beneficial and in some cases striking. Even in areas where Oidium was usually wont to be so severe that the trees were left practically leafless, a marked improvement in foliage has resulted, although complete prevention of leaf-fall has not been possible and cannot be expected with a single season's dusting. A number of letters of appreciation, expressing the undoubted benefits derived from dusting this year, have been received from owners of both estates and holdings.

The efficacy of the treatment was to some extent vitiated in certain areas as a result of wet weather during the latter half of March. Rain at such a time has the effect of both favouring the activities of Oidium and washing off a portion of the sulphur that has been dusted. As compared with the three other ranges, Gampola and Katugastota (particularly the Galagedera area) suffered less damage from this source owing to the fact that, due to early wintering, the majority of the new foliage had matured before the rains set in.

The problem of uneven wintering proved somewhat troublesome and should be carefully considered in future dusting schemes. Udispattu range, especially the Teldeniya area, was particularly bad in this respect. In most estates in this area, wintering of trees was found to occur not more or less together as is usual, but as a slow and prolonged process with small groups of trees here and there on the estate shedding their leaf at a time. Although this difficulty was overcome as far as possible by increasing the number of dustings and giving slightly smaller doses at a time, even at the end of 13 dustings several estates were found with 30 to 50 per cent of the trees not refoliated. The question therefore arises as to how advisable and economical it is to dust such areas at all. Not only does a portion of the estate remain untreated (by reason of its not having wintered) at the end of the normal treatment, but a portion of the sulphur that has been dusted gets wasted owing to the fact that actually only a small number of the trees was in the correct stage to benefit by it at the time of dusting. At one estate (40 acres), wintering as a rule was said to be spread out more or less over the whole year. Here, on the 15th of May, over 60 per cent of the trees (18 years old) had not yet wintered. This type of uneven and prolonged wintering appears to be associated to some extent with fertile soil conditions. Dusting with bombs might prove useful in cases of this kind.

QUANTITIES AND COSTS

A total of 17 tons 10 cwt. 48 lbs. of sulphur was used during the entire dusting operations. The average per acre for the complete treatment worked out at 39 lbs. with a maximum of 67 lbs and a minimum of 26 lbs.

Costs, including every item of actual expenditure on sulphur dusting account, are given below:—

	Total Cost Rs. cts.		Cost per acre Rs. cts.	
Supervision.				
1. Small-Holdings' Propaganda Officer's salary (for 4½ months) ...	2,925·00		2·91	
Small-Holdings' Propaganda Officer's travelling & Batta	1,195·80		1·19	
2. Five Supervisors' salaries @ Rs. 60 per mensem (including 7½% house allowance)	1,244·50		1·24	
Five Supervisors' travelling	285·03	5,650·33	0·28	5·62
Equipment.				
1. 6 Dusting machines and 6 trolleys @ Rs. 600 & Rs. 65 respectively *less* 5 per cent. discount	3,790·50		3·78	
Rail-freight on above (Colombo to Kandy)	18·02		0·02	
2. Sulphur (17 tons 10 cwt. 48 lbs.)	3,496·45		3·49	
Rail-freight on Sulphur	192·84		0·19	
3. Sulphur bombs	19·50	7,517·31	0·02	7·50
Transport.				
1. Lorry transport of machines and sulphur to ranges	161·05		0·16	
2. Transport (mainly cart-hire) of machines and sulphur to holdings, including carrying sulphur to machines	439·46	600·51	0·44	0·60
Labour.				
Labour on carrying dusting machines ...	681·99	681·99	0·68	0·68
Running Expenses.				
1. Petrol (including cost of 5 empty cans) ...	145·66		0·15	
2. Oil (Castrol XL.)	28·90	174·56	0·03	0·18
Miscellaneous.				
Including stationery, repairs and plugs for machines, rent for storing sulphur, advertising & printing charges, and all other petty items not included elsewhere	232·26	232·26	0·23	0·23
Total		14,856·96		14·81

The above account gives an all-inclusive cost of Rs. 14·81 for the complete dusting of one acre. In considering this figure however the following points should be noted.

The sum of Rs. 3,790·50 spent on the machines and trolleys and the rail freight thereon cannot, in entirety, be regarded as expenditure on the present dusting campaign, in view of the fact that the same machines could be used in future years. These sums might be written off in 3 years, which would debit only a third of them against this year's work. It might also be mentioned that the 6th machine and trolley were only used for part of the time as a result of repairs to one of the 5 machines in regular use. Some of the above supervision charges, such as the Small-Holdings' Propaganda Officer's salary and batta, should also be regarded as less than that actually debited above, in view of the fact that they would be the same even if a larger area had to be supervised. Taking these facts into consideration, the cost of the work, if a more comprehensive scheme were to be undertaken, would probably not exceed Rs. 10 per acre.

PROPAGANDA

A leaflet published in English as well as Sinhalese, briefly explaining the dusting campaign, was distributed to rubber owners in general throughout the 5 ranges. Boards which read as follows were erected at dusted holdings and estates which adjoined motor roads:—

RUBBER RESEARCH SCHEME
SULPHUR DUSTED AREA
(1936)

Every opportunity was taken to explain the purpose and method of sulphur-dusting to owners of estates as well as spectators who generally assembled in small groups to see the work.

DISCUSSION

Observations show that in the localities dusted Oidium infection prevails fairly generally. Practically every estate and holding is infected with the fungus either more or less during the refoliation season, and some of them severely. The intensity of the attack varies from year to year according to different factors, the chief among which is the weather, but that infection in certain areas at least is sufficiently damaging to justify prophylactic and remedial measures cannot be gainsaid.

Experience gained from the dusting campaign shows fairly clearly that the real small-holder, *i.e.* the owner of a land of 10 acres and less, whilst being very glad to have his holding dusted free of charge, is on no account prepared to pay for it.

He is sometimes willing to do what little he can by assisting in the work but pay he will not. Even Sinhalese, Tamil and Indian owners of lands of 11 to 30 acres, though they generally belong to the richer *mudalali* class, are none too willing to pay, and the Tamils and Indians in particular, though sometimes anxious to have the dusting done at a small payment, do all they can to try and beat the price down, low as it is, to an impossible level. The class of owners of lands of 31 to 100 acres cannot be regarded as small-holders at all and generally consists of the wealthy and educated Sinhalese, Europeans, Burghers etc. They realise and appreciate the value of the treatment and were often only too anxious to have the dusting done at the reduced rate of Rs. 2·50 per acre, although it is difficult to say at present what precise demand there would be if the rate were to be raised to the actual cost of the work. Whatever policy is followed in future years, it is felt that dusting of small-holdings (1 to 10 acres), if done at all, will have to be done free of charge, while from estates of 31 to 100 acres a fair demand for dusting on payment may be expected although this is bound to vary according to the rate charged. On the intermediate class of 11 to 30-acre estate, no definite reliance should be placed, as willingness to pay will depend largely on the mentality and progressiveness of each owner. Any future dusting scheme should be widely made known well in advance of the dusting season. During this year's dusting, assistance in the form of supplying extra labour to carry machine and sulphur, clearing paths through holdings, and provision of refreshments to the "carriers", was provided by paying as well as non-paying owners, though not in every case.

Oidium on the whole was not as bad this year as in 1935 and 1934, though individual areas were sometimes very severely affected. Among holdings available for selection were ones whose trees were so poorly grown and badly tapped that dusting would have only meant a waste of time and money. Such holdings were not included, but one or two of them dusted experimentally showed that though an improved canopy was produced by dusting, the trees were in too poor a state to derive any tangible benefit therefrom. No complaints were received regarding damage caused by sulphur getting blown on to other crops. One owner was unwilling to allow her holding to be dusted even free of charge.

RUBBER RESEARCH SCHEME (CEYLON)

Minutes of the thirty-second meeting of the Board of Management held in the Committee Room of the Ceylon Chamber of Commerce, Colombo, at 10 a.m. on Thursday, 21st May, 1936.

Present.—Mr. E. Rodrigo C.C.S. (in the chair), Mr. C. H. Collins, C.C.S., (Deputy Financial Secretary) Mr. L. B. de Mel, J.P., U.P.M., Mr. L. M. M. Dias, Col. T. G. Jayewardene, V.D., Mr. J. C. Kelly, Mr. F. A. Obeyesekere, Mr. C. A. Pereira, Mr. B. M. Selwyn, Mr. E. C. Villiers, M.S.C., Mr. E. W. Whitelaw and Col. T. Y. Wright.

Mr. R. K. S. Murray, Acting Director of Research, was also present by invitation.

Apology for absence was received from Mr. F. H. Griffith, M.S.C.

A vote of condolence on the death of Mr. C. E. A. Dias was recorded.

1. MINUTES

(a) Draft minutes of the thirty-first meeting which had been circulated to members were confirmed and signed by the Chairman.

(b) MATTERS ARISING FROM MINUTES

1. *Technical Officers' Reports.*—It was decided to enquire whether the London Advisory Committee wished to have the reports of all the Technical Officers sent to them or only that of the Director of Research as the latter contained all the salient points mentioned in the others.

2. *Report of Small-Holdings Committee.*—The recommendations of the Committee were adopted and it was decided that work should be started on the lines suggested *i.e.*, with two Instructors in the Kalutara District. The Committee was re-appointed as a standing Sub-Committee.

2. BOARD

The following changes in the membership of the Board were reported :—

1. Resignation of Mr. J. L. Kotalawala consequent on his appointment as Minister for Communications and Works.

2. Nomination of Mr. J. L. D. Peiris to the seat rendered vacant by the death of Mr. C. E. A. Dias.

3. Nomination of Mr. L. M. M. Dias to the seat vacated by Mr. C. H. Z. Fernando.

Messrs. Kotalawala and Fernando were thanked for their services and Messrs. Dias and Peiris were welcomed to the Board.

3. DECISION BY CIRCULATION OF PAPERS

Application for Grant from the Department of Industries.—Reported that members had agreed that application should be made for Rs. 35,000 instead of Rs. 30,000 as decided at the last meeting.

4. PATENTS

(a) *Draft Amending Ordinance.*—The draft Ordinance prepared by the Board's lawyers and revised by the Legal Draftsman was tabled. It was reported that this was gazetted on 3rd April and would be placed before the State Council in due course.

(b) *Examination of Applications for Ceylon Patents.*—It was decided that the question of arranging with the Registrar-General for examination of applications for patenting processes connected with rubber was not of sufficient benefit to be pursued.

5. VISIT OF AN OFFICER TO MALAYA

A letter from the Ceylon Estates Proprietary Association, enquiring, at the request of the Ceylon Association in London, whether it would be possible to send an officer of the Scheme to Malaya and the Dutch East Indies with a view to obtaining reliable information regarding the yields of budgrafted trees in commercial tapping in those counrties, was considered. It was decided that Mr. Murray should undertake the visit on the return of Mr. O'Brien from leave in October next.

6. ACCOUNTS

(a) Statement of Receipts and Payments of the Board for the quarter ended 31st March, 1936, was approved subject to further information being given regarding (1) the amount shown as Cess collections during the quarter; and (2) the disposal of the balance of the Government grant for the Sulphur-Dusting Scheme.

(b) Dartonfield and Nivitigalakele Accounts for January and February, 1936 were tabled.

(c) Renewal of the following Fixed Deposits was reported:—

Rs. 10,000 at the Hongkong & Shanghai Bank @ 2 per cent. for 1 year from 19-3-36.

Rs. 10,000 at the Hongkong & Shanghai Bank @ 2 per cent. for 1 year from 20-3-36.

Rs. 60,000 at the Chartered Bank @ 2 per cent. for 1 year from 20-3-36.

Rs. 10,000 at the Chartered Bank @ 2 per cent. for 1 year from 1-4-36.

7. STAFF

(a) Reported that Mr. T. E. H. O'Brien's new agreement was not yet ready for signature. A letter from Mr. O'Brien accepting the leave terms decided on at the last meeting, was read.

(b) A letter from Mr. M. W. Philpott asking for his salary to be placed on an incremental scale was read and left over for consideration at the next meeting after circulation of all papers relative to his appointment.

(c) Changes in Junior Staff were reported.

8. EXPERIMENTAL COMMITTEE

(a) Mr. F. A. Obeyesekere and Mr. B. M. Selwyn were appointed to fill the vacancies caused by the resignation of Mr. J. L. Kotalawala and the death of Mr. C. E. A. Dias.

(b) RECOMMENDATIONS DEFERRED AT THE BOARD MEETING OF 19TH MARCH

1. *Bungalow Lighting and Water Supply.*—The undermentioned rates of charges proposed by the Treasury representative for supply of electric current to staff bungalows were approved:—

Director's bungalow	...	Rs. 25 per month
Technical Officers' bungalows	...	,, 20 ,, ,,
Estate Superintendent's and Secretary's bungalows	...	,, 15 ,, ,,

2. *Manufactured Goods.*—The recommendation that the sale of rubber tubing and other vulcanised articles made at Dartonfield should be encouraged with a view to demonstrating the possibilities of local manufacture, was approved.

(c) RECOMMENDATIONS MADE AT MEETING OF 3RD APRIL, 1936.

The following recommendations were approved:—

1. Provision of a motor-shed for the Estate Superintendent's bungalow.
2. Telephone extensions at Dartonfield.
3. Purchase of an electric blower.

9. VISITING AGENT'S REPORT

Left for consideration pending the submission of recommendations by the Experimental Committee.

10. PATENT FOR STEARATE CRUMB

Decided to authorise the Rubber Producers' Research Association to file an application for Letters Patent on behalf of an officer of the Scheme for patenting the process for preparing a soft type of rubber from Stearate Crumb.

11. IRIYAGAMA DIVISION

Decided that Government be informed that the Board is willing to take over the Iriyagama Division provided that all excess of expenditure over revenue be met from the Rubber Restriction Fund up to the end of 1938.

RUBBER RESEARCH SCHEME (CEYLON)

Minutes of the thirty-third meeting of the Board of Management held in the Committee Room of the Ceylon Chamber of Commerce, Colombo, at 10 a.m. on Thursday, 23rd July, 1936.

Present.—Mr. E. Rodrigo, C.C.S. (in the chair), Mr. C. H. Collins, C.C.S., (Deputy Financial Secretary), Mr. I. L. Cameron, Mr. L. M. M. Dias, Mr. George E. de Silva, M.S.C., Mr. F. H. Griffith, M.S.C., Col. T. G. Jayewardene, V.D., Mr. R. C. Kannangara, M.S.C., Mr. J. C. Kelly, Mr. F. A. Obeyesekere, Mr. J. L. D. Peiris, Mr. C. A. Pereira, Mr. B. M. Selwyn, Mr. E. C. Villiers, M.S.C., Mr. E. W. Whitelaw and Col. T. Y. Wright.

Mr. R. K. S. Murray, Acting Director of Research, was also present by invitation.

1. MINUTES

(a) Draft minutes of the thirty-second meeting, which had been circulated to members, were confirmed and signed by the Chairman.

(b) MATTERS ARISING FROM MINUTES

1. *Report of Small-Holdings Committee.*—It was decided:—1. That the designation of the Officer-in-charge of the Small-Holdings Department should be Small-Holdings' Propaganda Officer; 2. That the Report on Mr. Pieris' visit to Malaya should not be published.

2. *Report of Committee on Duties of the Director of Research.*—The duties of the Director were defined and it was agreed that the designation of the post should in future be "Director" rather than "Director of Research".

3. *Application for Grant from the Department of Industries.*—The Chairman reported that a reply had been received from the Hon'ble the Minister for Labour, Industry and Commerce, enquiring why the amount in question could not be disbursed from the funds at the Scheme's disposal. The draft reply prepared by the Acting Director was approved. It was also agreed that a deputation of three members of the Board and the Acting Director should interview the Minister and his Committee in this connection.

4. *Visit of Mr. R. K. S. Murray to Malaya and the Netherlands East Indies.*—The memorandum prepared by the Acting Director outlining the field of work to be covered by the visit was approved subject to certain minor modifications.

5. *Manufactured Goods.*—Decided that the prices to be charged for rubber tubing manufactured at Dartonfield should be approximately 75 per cent. of the prices at which the corresponding articles are imported by Government.

2. BOARD

The Chairman welcomed to the Board Mr. R. C. Kannangara who had been appointed to represent the State Council from 26-6-36 in place of Mr. J. L. Kotalawala who had resigned.

He also reported that Col. T. G. Jayewardene had been renominated by the Low-Country Products Association to serve on the Board for a further period of 3 years from 26-6-36.

3. DECISION BY CIRCULATION OF PAPERS

Reported that members had agreed to the adoption of the London Advisory Committee's Report for 1935.

4. EXPERIMENTAL COMMITTEE

Recommendations made at meetings held on 11th and 21st May and 22nd June, 1936:—

(a) *Visiting Agent's Report*—approved.

(b) *Estimate for Clearing Land behind and between Junior Staff Bungalows.*—The estimate of Rs. 389·90 recommended by the Committee was approved.

(c) *Road to Pinnagoda Clearing.*—The proposition and estimate submitted by the Committee were approved and a supplementary vote of Rs. 2,600 passed.

5. ENQUIRIES FROM GOVERNMENT DEPARTMENTS AND PUBLIC INSTITUTIONS

(a) The reply sent to an enquiry from the Rubber Controller regarding the supplies of selected budded material and seed available in Ceylon was approved.

(b) A letter from the Registrar-General, forwarding an enquiry from Messrs. Miller & Co., Ltd., regarding the manufacture and prices of rubber flooring, was considered. The terms of reply were left to the Acting Director.

(c) A letter from the Secretary, Central Board of Agriculture, regarding the use of scrapers was read. It was agreed that the use of scrapers for ordinary weeding purposes was most undesirable but that prohibitive legislation would be of doubtful value, and the Acting Director was instructed to prepare a memorandum on the subject to be considered at the next meeting.

6. SULPHUR-DUSTING SCHEME

The report on the Dusting Scheme and a memorandum on the subject prepared by the Acting Director were considered. It was decided that a Bulletin containing the report of the Oidium Committee, an account of investigations on the control of the disease and the report on the Dusting Scheme be prepared for publication and submitted to Government, Planters' Associations and Public Institutions.

7. ACCOUNTS

(a) Statement of Receipts and Payments of the London Advisory Committee for the quarter ended 31st March, 1936, was approved.

(b) Dartonfield and Nivitigalakele Accounts for March and April 1936 were tabled.

8. PUBLICATIONS

(a) *The 1st Quarterly Circular* for 1936 was tabled.

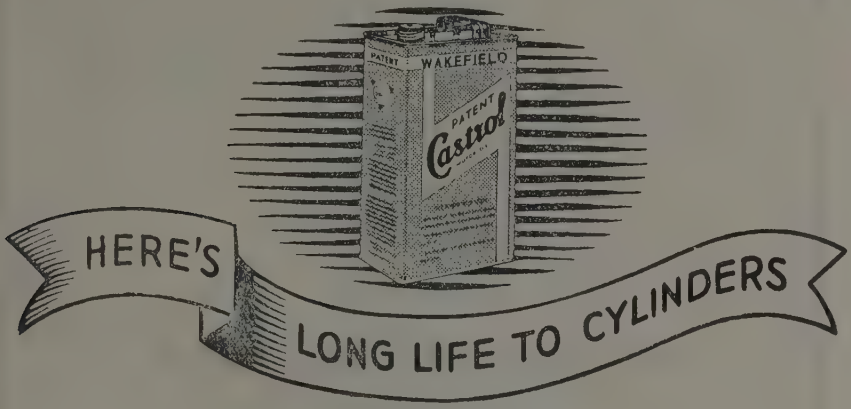
(b) In reply to a request it was decided that 60 copies of the Scheme's publications should in future be sent to the Ceylon Association in London.

9. SALE OF BUDWOOD AND BUDDED STUMPS

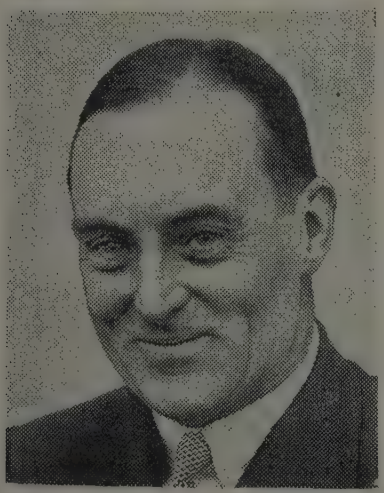
As a limited quantity of budwood and budded stumps would be available for sale in 1937, it was decided to invite applications by advertisement in the English and Vernacular Press and to consider the allocation of the material and the prices to be charged at the next meeting when the applications would have been received.

10 LONDON ADVISORY COMMITTEE

Decided that the contribution towards the expenditure of the London Advisory Committee for the 5 years 1937-1941 should be £875 per annum.



DO YOU KNOW A BETTER OIL THAN WAKEFIELD PATENT CASTROL ?



SIR, MALCOLM CAMPBELL, M.B.E.

Sir Malcolm Campbell Doesn't–

Neither do Ceylon's Racing Motorists

Five out of the Six events and the Team Prize at the Leangawella Hill Climb were won on Wakefield Patent Castrol Motor Oil

The Product of an All-British Firm

C. C. WAKEFIELD & CO., LTD.

TIMES BUILDING, COLOMBO.

THE

JUDICIOUS MANURING

OF

RUBBER

ENSURES

HEALTHY FOLIAGE

AND

GOOD BARK RENEWAL

SUITABLE

FERTILISERS

FOR

RUBBER

AND ALL OTHER CROPS

ALWAYS IN STOCK

THE COLOMBO

COMMERCIAL CO., LTD.

SULPHUR DUSTING

FOR USE WITH THE

C. C. C. "NOIDIUM" MACHINE

(As used by the Rubber Research Scheme)

We recommend

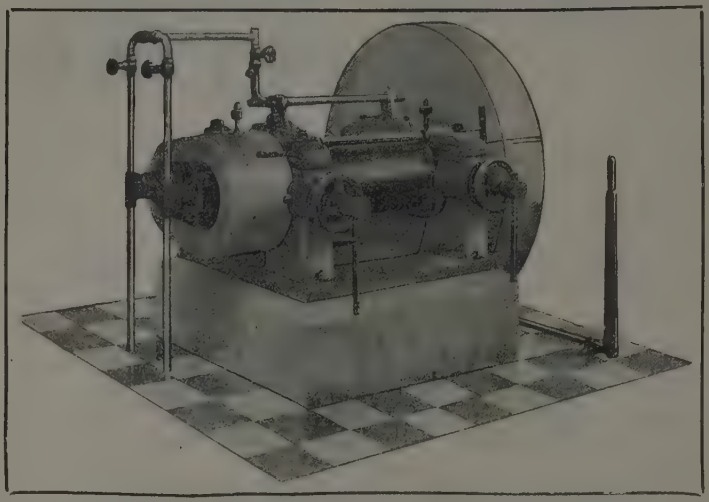
COOPER'S SPECIAL SPREADING SULPHUR

THE

COLOMBO COMMERCIAL Co., Ltd.

COLOMBO, BADULLA, KANDAPOLA, KANDY, HATTON

RUBBER MACHINERY



Makers of Rubber Creping and Washing Mills, Scrap Washing and Sheeting Mills.

Sole Agents in Ceylon for

Messrs. David Bridge's Rubber Machinery

THE

COLOMBO COMMERCIAL Co., Ltd.

COLOMBO, BADULLA, KANDAPOLA, KANDY, HATTON

UNEXPECTED FAILURE IS EXPENSIVE

AND LIABLE TO STRESS YOUR TEMPER

STORAGE BATTERIES

Willard

GIVE TROUBLE FREE SERVICE
LONG LIFE—CRANK FASTER

C. E. T. & L. CO., LTD.,

AGENTS:

BOUSTEAD BROS.,

SALES & SERVICE. UNION PLACE.

BROUGHAMS

ANNUAL SALE

Genuine Bargains in Glass and Chinaware, Kitchenware, English Baths, Bathroom Fittings, Household Linen and All House Furnishings

HAVE YOU RECEIVED OUR SALE CATALOGUE
IF NOT PLEASE APPLY TO:—

BROUGHAMS LTD.,

YORK ARCADE, COLOMBO.

BRUNOLINUM
"PLANTARIUM"

INDISPENSABLE

FOR THE

PROTECTION

OF

RUBBER TREES

The cheapest and most effective Disease preventative obtainable.

Its effectiveness and efficiency is due to its combined properties of "Penetration" with "Surface Formation."

PRICES:

1-Gallon Tin	...	**Rs. 6·50**
5-Gallon Drum	...	**Rs. 30·00**

WALKER, SONS & Co., LTD.

RUBBER

Replanting

Success follows the use of

Sterilised Animal Meal BLACK LABEL

in the planting holes.

FOR DETAILS APPLY TO

BRITISH FERTILISERS LTD.

SHAW WALLACE & Co.

MANAGING AGENTS.

FOR

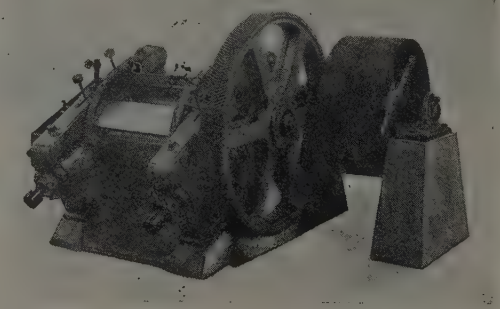
A RUBBER MACHINE OF SOUND DESIGN & SOLID CONSTRUCTION

YOU

CANNOT IMPROVE UPON A

BROWN'S NEW PATTERN RUBBER MILL

As supplied to the Rubber Research Scheme Factory



This machine is built in our Colombo Workshop to deal with the heaviest rolling. The rolls are 24″ or 26″ long and 14″ diameter.

Please send for full particulars or call at our Works and inspect one.

Brown & Co
ENGINEERS & MERCHANTS
LTD.,

LANKA WORKS, COLOMBO.

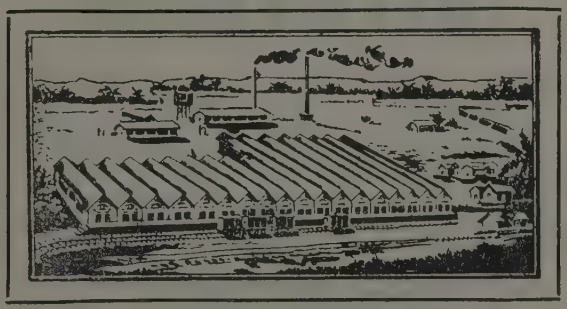
Make **RUBBER** pay

by giving your trees the needed Plant food, supplied in BAUR'S

well-balanced manure mixtures

BAUR'S "ELECTRIC" DUSTING SULPHUR

will check Oidium Disease on your estate

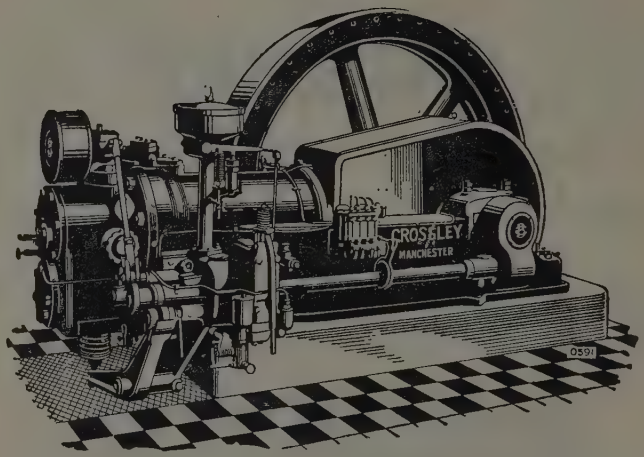


THE CEYLON MANURE WORKS

A. BAUR & Co.,

COLOMBO.

Phone No. 164 & 165 P.O. Box No.11



CROSSLEY
ENGINES

FOR

ALL REQUIREMENTS

RELIABILITY—ECONOMY

LONG LIFE

Walker & Greig, Ltd

ENGINEERS

COLOMBO AND BRANCHES

PARAKRAMA & Co.,

ENGINEERS

CEYLON ENGINEERING WORKS

P. O. Box 102

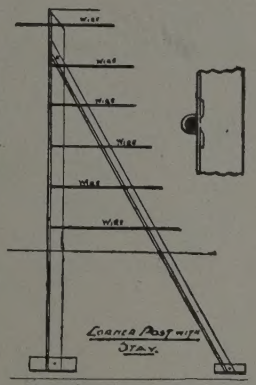
For

RUBBER FACTORIES
SMOKE HOUSES

ESTATE BUNGALOWS
LINES AND LATRINES
HAND RUBBER ROLLERS

C. I. ESTATE NAME BOARDS
REPAIRS TO MACHINERY

ALL WORK DONE UNDER EXPERT SUPERVISION.



Angle Iron Fence Posts. The Most durable substantial and economical post in the Market. Cts. 85 each Painted Red, Black or Green.

For Rates and Particulars of Advertisements in

The Quarterly Circular

apply to:—

The Director of Research,

Rubber Research Scheme,

NEBODA.

London Advisory Committee for Rubber Research (Ceylon and Malaya).

Member nominated by the Colonial Advisory Council of Agriculture and Animal Health.

Mr. F. A. Stockdale, C.M.G., C.B.E.

Member nominated by the Government of Ceylon.

Lieutenant-Colonel Sir David Prain, C.M.G., C.I.E.

Member nominated by the Governments in British Malaya.

Mr. J. Lornie, C.M.G.

Members representing Malayan Planting interests — nominated by the Rubber Growers' Association.

Mr. P. J. Burgess, (Chairman),
Mr. W. J. Gallagher,
Mr. H. Eric Miller.

Members representing Ceylon Planting interests — nominated by the Rubber Growers' Association.

Sir Herbert Wright,
Mr. G. H. Masefield,
Mr. George Brown.

Member representing Manufacturing interests.

Lieutenant-Colonel J. Sealy Clarke.

Ex-Officio Members.

Sir H. A. F. Lindsay, K.C.I.E., C.B.E., Director of the Imperial Institute.
Professor V. H. Blackman, Director of the Botanical Laboratories, Imperial College of Science and Technology.
Mr. S. F. Ashby, Director of the Imperial Mycological Institute
Sir John Russell, O.B.E., Director of the Rothamsted Experimental Station.

Secretary.

Mr. J. A. Nelson, B.Sc.

The Technical Sub-Committee consists of members of the Advisory Committee with the following co-opted Members.

Mr. G. Martin, (Superintendent of Rubber Investigations).
Mr. G. E. Coombs,
Mr. Ian. D. Patterson,
Mr. B. D. Porritt,
Mr. H. N. Ridley,
Mr. W. C. Smith,
Dr. H. P. Stevens,
Dr. D. F. Twiss.

STAFF.

Mr. G. Martin, B.Sc., A.I.C., F.I.R.I.,
Mr. W. S. Davey, B.Sc., A.I.C., F.I.R.I.,
Mr. H. C. Baker, M.Sc., A.I.C., A.I.R.I.

RUBBER RESEARCH SCHEME (CEYLON)

LIST OF PUBLICATIONS FOR SALE.

Bulletins No. 1-20. Bound volume **Rs. 5-00. Later Bulletins Re. 1-00** per copy

No. 1. The Effect of Tapping on the Movements of Plant-Food in Hevea brasiliensis.
No. 2. The Effect of Tapping on the Movements of Plant-Food in Hevea brasiliensis.
No. 3. Seasonal Variations in the Movements of Plant-Food in Hevea brasiliensis Part I.
No. 4. The Physiological Effects of Various Tapping Systems, Part I.
No. 5. Progress Report on Vulcanization Tests
No. 6. The Physiological Effects of Various Tapping Systems, Part II.
No. 7. Do Do Do Part III
No. 8. Seasonal Variations in the Movements of Plant-Food in Hevea brasiliensis, Part II.
No. 9. Vulcanization Tests.
No. 10. Do.
No. 11. Variability in Rubber Manufacture.
No. 12. Progress Report of the Rubber Research Chemist.
No. 13. Vulcanization Tests.
No. 14. On the Variation in the Number of Latex Vessels present in Hevea brasiliensis.
No. 15. Vulcanization Tests.
No. 16. On the Natural Clotting of Rubber Latex.
No. 17. Vulcanization Tests.
No. 18. Measurements of "Bark Renewal."
No. 19. Vulcanization Tests.
No. 20. Do.
No. 21. Do.
No. 22. Do.
No. 23. Do.
No. 24. Do.
No. 25. Investigations on Samples of Plantation Para Rubber from Ceylon.
No. 26. Results of Trials of Ceylon Plantation Rubber for the manufacture of Ebonite.
No. 27. Investigations on Samples of Plantation Para Rubber from Ceylon.
No. 28. Do.
No. 29. Summary of the Principal Results obtained from Investigations into the Properties of Ceylon Plantation Rubber in relation to its Method of Preparation.
No. 30. The penetration of disinfectant on the tapping cut of Hevea brasiliensis.
No. 31. On the Occurrence of "Rust" on Sheet Rubber.
No. 32. On the Preservation of Latex.
No. 33. Investigations on Samples of Plantation Para Rubber from Ceylon.
No. 34. Do.
No. 35. Do.
No. 36. Do.
No. 37. Do.
No. 38. Do.
No. 39. Do. (Final Report Series I.)
No. 40. Do Series II.
No. 41. Do. First Interim Report on artificial ageing tests.
No. 42. On the Smoking of Sheet Rubber in relation to Mould Prevention.
No. 43. The inter-relationship of Yield and the various Vegetative Characters in Hevea brasiliensis. (out of print).
No. 44. The Construction of Smokehouses for Small Rubber Estates. (out of date).
No. 45. The Efficiency of Disinfectants and Fungicides.
No. 46. The Control of Bark Rot by Disinfectants.
No. 47. Report on Variability of Ceylon Estate Grades.
No. 48. Brown Bast and its Treatment.
No. 49. Report on Causes of Variation in Plasticity.
No. 50. Crepe Rolling.
No. 51. The Curing of Sheet Rubber.
No. 52. The Preparation of Uniform Rubber.

Booklets at Rs. 2-50 per copy.

Guide to the Preparation of Plantation Rubber, by T. E. H. O'Brien, M.Sc., A.I.C., Chemist.

The Budding of Rubber, by R. A. Taylor, B.Sc., Physiological Botanist. (out of date).

Diseases of Rubber in Ceylon, by R. K. S. Murray, A.R.C.Sc., Mycologist.

Copies of the following publications of the Rubber Research Institute of Malaya are available at the prices indicated:—

Planting Manual No. 4—Latex Preservation and Shipment **Rs. 3-50.**
" " " 6—The history and description of clones of Hevea Braziliensis. **Rs. 5-00.**